Amendments to the Specification:

Please replace the paragraph starting on line 10 of page 1 with the following amended paragraph:

There are a number of different forms of differential confocal microscopy. In one differential form, the Nomarski microscope measures one component of a conjugated quadratures of fields corresponding to the electrical interference signal of two images superimposed in an image plane. In another differential form, the conjugated quadratures of a dark field are measured one point at a time. In another differential form, the conjugated quadratures of each of two fields corresponding to two images are superimposed in an image plane one point at a time. In commonly owned U.S. Provisional Patent Application No. 60/447,254 (ZI-40) entitled "Transverse Differential Interferometric Confocal Microscopy" and U.S. Patent Application No. [[_____]] 10/778,371, filed Feb. 13, 2004 (ZI-40) also entitled "Transverse Differential Interferometric Confocal Microscopy" both of which are both by Henry A. Hill, it is taught how to practice transverse differential interferometric confocal microscopy. The contents of the cited U.S. Provisional Application and the U.S. Patent Application are herein incorporated in their entirety by reference.

Please replace the paragraph starting on line 13 of page 22 with the following amended paragraph:

The bi- and quad-homodyne detection methods obtain measurements of electrical interference signals wherein each measured value of an electrical interference signal contains simultaneously information about two orthogonal components of conjugated quadratures. The two orthogonal components correspond to orthogonal components of conjugated quadratures such as described in cited U.S Provisional Patent Application No. 60/442,858 (ZI-47) and cited U.S. Patent Application No. 10/765,369, filed Jan. 27, 2004 (ZI-47) entitled "Apparatus and Method for Joint Measurements of Conjugated Quadratures of Fields of Reflected/Scattered and Transmitted Beams by an Object in Interferometry."

Please replace the paragraph starting on line 1 of page 24 with the following amended paragraph:

Referring to the bi-homodyne detection method used in some embodiments, a set of four electrical interference signal values are obtained for each pair of spots in or on substrate **60** being imaged such as described in commonly owned U.S. Provisional Patent Application No. 60/442,858 (ZI-47) and entitled "Apparatus and Method for Joint Measurements of Conjugated Quadratures of Fields of Reflected/Scattered Beams by an Object in Interferometry" and U.S. Patent Application No. 10/765,369, filed Jan. 27, 2004 (ZI-47) and entitled "Apparatus and Method for Joint Measurements of Conjugated Quadratures of Fields of Reflected/Scattered and Transmitted Beams by an Object in Interferometry" both of which are by Henry A. Hill. The contents of both the cited U.S. Provisional Patent Application and the U.S. Patent Application are herein incorporated in their entirety by reference. The set of four electrical interference signal values S_j, $j=1,2,3,4$ used for obtaining conjugated quadratures of fields for a single a spot on and/or in a substrate being imaged is represented for the bi-homodyne detection within a scale factor by the formula

$$S_j = P_j \begin{Bmatrix} \xi_j{}^2|A_1|^2 + \zeta_j{}^2|B_1|^2 + \eta_j{}^2|C_1|^2 + \zeta_j\eta_j 2|B_1||C_1|\cos\varphi_{B_1C_1\varepsilon_j} \\ +\xi_j\zeta_j 2|A_1||B_1|\cos\varphi_{A_1B_1\varepsilon_j} + \varepsilon_j\xi_j\eta_j 2|A_1||C_1|\cos\varphi_{A_1C_1} \\ +\xi_j{}^2|A_2|^2 + \zeta_j{}^2|B_2|^2 + \eta_j{}^2|C_2|^2 + \zeta_j\eta_j 2|B_2||C_2|\cos\varphi_{B_2C_2\gamma_j} \\ +\xi_j\zeta_j 2|A_2||B_2|\cos\varphi_{A_2B_2\gamma_j} + \gamma_j\xi_j\eta_j 2|A_2||C_2|\cos\varphi_{A_2C_2} \end{Bmatrix} \quad (5)$$

where coefficients A_1 and A_2 represent the amplitudes of the reference beams corresponding to the first and second frequency components of the input beam; coefficients B_1 and B_2 represent the amplitudes of background beams corresponding to reference beams A_1 and A_2, respectively; coefficients C_1 and C_2 represent the amplitudes of the return measurement beams corresponding to reference beams A_1 and A_2, respectively; P_j represents the integrated intensity of the first frequency component of the input beam in pulse j of the pulse sequence;

and the values for ε_j and γ_j are listed in Table 1. The change in the values of ε_j and γ_j from 1 to -1 or from -1 to 1 correspond to changes in relative phases of respective reference and measurement beams. The coefficients ξ_j, ζ_j, and η_j represent effects of variations in properties of a conjugate set of four pinholes such as size and shape used in the generation of the spot on and/or in substrate **60** and the sensitivities of a conjugate set of four detector pixels corresponding to the spot on and/or in substrate **60** for the reference beam, the background beam, and the return measurement beam, respectively. [[.]]

Please replace the paragraph starting on line 11 of page 44 with the following amended paragraph:

A first embodiment comprises the interferometer system of Figs. **1a-1c** with interferometer **10** of the first embodiment shown schematically in Fig. **2a**. Interferometer **10** comprises an interferometer such as described in commonly owned U.S. Provisional Patent Application No. 60/447,254 (ZI-40) entitled "Transverse Differential Interferometric Confocal Microscopy" and U.S Patent Application <u>No. 10/778,371,</u> filed February 13, 2004 (ZI-40) also entitled "Transverse Differential Interferometric Confocal Microscopy" both of which are by Henry A. Hill. The contents of [[theU.S.]] <u>the U.S.</u> Provisional Patent Application and the U.S. Patent Application are herein incorporated in their entirety by reference.

Please replace the paragraph starting on line 20 of page 44 with the following amended paragraph:

Interferometer **10** of the first embodiment comprises a first imaging system generally indicated as numeral **110**, pinhole array beam-splitter **112**, detector **70**, and a second imaging system generally indicated as numeral **210**. The second imaging system **210** is low power microscope having a large working distance, *e.g.* Nikon ELWD and SLWD objectives and Olympus LWD, ULWD, and ELWD objectives. The first imaging system **110** comprises an interferometric confocal microscopy system described in part in commonly owned U.S. Provisional Application No. 60/442,982 [ZI-45] entitled

"Interferometric Confocal Microscopy Incorporating Pinhole Array Beam-Splitter" and U.S. Patent Application No. [[_____]] 10/765,229, filed January 27, 2004 (ZI-45) and also entitled "Interferometric Confocal Microscopy Incorporating Pinhole Array Beam-Splitter" both of which are by Henry A. Hill. The contents of both of the U.S. Provisional Patent Application and the U.S. Patent Application are herein incorporated in their entirety by reference.

Please replace the paragraph starting on line 12 of page 54 with the following amended paragraph:

An error in the either of the values assumed for reflectivity coefficients $R_1^{1/2}$ and $R_2^{1/2}$ can introduce an error in the determination of $(h_1 - h_2)$. Information about local values of reflectivity coefficients $R_1^{1/2}$ and $R_2^{1/2}$ can be obtained by an independent measurement. The measured conjugate quadratures in the second embodiment of cited U.S. Provisional Application No. 60/447,254 (ZI-40) and U.S. Patent Application No. [[_____]] 10/778,371, filed Feb. 13, 2004 (ZI-40) entitled "Transverse Differential Interferometric Confocal Microscopy" are proportional to components of complex amplitude $V_1(h_1, 0, h_1, 0, \chi = \pi)$. The complex amplitude $V_1(h_1, 0, h_1, 0, \chi = \pi)$ of the cited U.S. Provisional Application No. 60/447,254 (ZI-40) and U.S. Patent Application No. [[_____]] 10/778,371, filed Feb. 13, 2004 (ZI-40) entitled "Transverse Differential Interferometric Confocal Microscopy" corresponds to a special case of Equation 36, *i.e.*,

$$V_1(h_1, 0, h_2, 0, \chi = \pi) = \left[R_1^{1/2} - R_2^{1/2}\right](1 - i\beta h_1). \qquad (38)$$

Thus an independent determination the difference in local values of reflectivity coefficients $R_1^{1/2}$ and $R_2^{1/2}$ can be obtained from a measured value of complex amplitude $V_1(h_1, 0, h_1, 0, \chi = \pi)$ and used to reduce an error in the determination of $(h_1 - h_2)$.

Please replace the paragraph starting on line 9 of page 57 with the following amended paragraph:

Compensation for the effects of a mismatch of indices of refraction at the interface of substrate **60** with an external a medium, *e.g.*, air, may be compensated in the first and second embodiments by the addition of a thin low index of refraction layer between pinhole array beam-splitter **112** and lens **150** such as described in U.S. Provisional Patent Application No.. 60/444,707(ZI-44) entitled "Compensation for Effects of Mismatch in Indices of Refraction at a Substrate-Medium Interface in Confocal and Interferometric Confocal Microscopy" and U.S. Patent Application No. [[_____]] 10/771,785, filed February 4, 2004 (ZI-44) and also entitled "Compensation for Effects of Mismatch in Indices of Refraction at a Substrate-Medium Interface in Confocal and Interferometric Confocal Microscopy" both of which are by Henry A. Hill. The contents of the U.S. Provisional Patent Application and the U.S. Patent Application are incorporated herein in their entirety by reference. With the compensation for effects of the mismatch in refractive indices, an interior portion of a substrate is imaged with a lateral resolution down to of the order of 100 nm and a longitudinal resolution down to of the order of 200 nm. The images of the interior portion are obtained with a working distance of the order of a mm and for depths within the substrate of the order of at least 3 microns.

Please replace the paragraph starting on line 25 of page 57 with the following amended paragraph:

The throughputs of the first and second embodiments can be further increased by the use of a pinhole array beam-splitter that is coupled to input beam **24** by a guided wave structure such as described in commonly owned U.S. Provisional Patent Application No. 60/445,739 (ZI-39) entitled "Multiple-Source Arrays Fed By Guided Wave Structures And Resonant Structures For Confocal And Near-Field Confocal Microscopy" and U.S. Patent Application No. [[_____]] 10/774,250, filed February 6, 2004 (ZI-39) and also entitled "Multiple-Source Arrays Fed By Guided Wave Structures And Resonant Structures For Confocal And Near-Field Confocal Microscopy" both of which are by Henry A. Hill. The contents of the cited U.S. Provisional Patent Application and the U.S. Patent Application are incorporated herein in their entirety by reference.

Please replace the paragraph starting on line 5 of page 58 with the following amended paragraph:

The first and second embodiments may also be configured for quad-homodyne detection such as described herein and in cited U.S. Provisional Patent Application No. 60/442,858 (ZI-47) and cited U.S. Patent Application No. 10/765,369, filed Jan. 27, 2004 (ZI-47) entitled "Apparatus and Method for Joint Measurements of Conjugated Quadratures of Fields of Reflected/Scattered Beams by an Object in Interferometry" (ZI-47).

Please replace the paragraph starting on line 4 of page 62 with the following amended paragraph:

Other embodiments may use the quad-homodyne detection method instead of the bi-homodyne detection method as variants of the embodiments. For the embodiments that are based on the apparatus shown in Figs. **1a-1c**, the corresponding variants of the embodiments that use the quad-homodyne detection method use variants of the apparatus shown in Figs. **1a-1c**. In the variants of the apparatus such as used in the first embodiment, microscope **220** is modified to include a dispersive element such as a direct vision prism and/or a dichroic beam-splitter. When configured with a dichroic beam-splitter, a second detector is further added to the system. Descriptions of the variants of the apparatus are the same as corresponding portions of descriptions given for corresponding systems in cited U.S. Provisional Application No. 60/442,982 (ZI-45) and U.S. Patent Application No. [[_____]] 10/765,229, filed January 27, 2004 (ZI-45) entitled "Interferometric Confocal Microscopy Incorporating Pinhole Array Beam-Splitter".